

**Growing Concerns of Childhood Obesity;
Focusing on the Children of the Gila River Pima Indian Community**

By

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Abstract

There is a growing concern for the problem of childhood obesity in the United States. As many as 12.5 million children in this country are considered overweight, which intensifies risks for a multitude of serious health issues (Office of the Surgeon General, 2010). Overweight and obese children are prone to mental anguish, depression, poor self esteem, type 2 diabetes, cardiovascular disease, high blood pressure, high cholesterol and other possible health problems.

There is a high prevalence of overweight and obese children in the American Indian population and in the Gila River Indian Community. The obesity problem is particularly concerning in the Gila River Indian Community because of the currently existing high prevalence of health problems associated with obesity including diabetes, coronary heart disease and hypertension. Additionally, obesity and the associated co-morbidities present a tremendous economic impact on the self-governance health system.

The 2007 Behavioral Risk Factor Surveillance System (BRFSS) study identifies increased prevalence of obesity associated with disparities and ethnicity (CDC, 2007). Approximately 47% of the adult Pima Indian population is obese. The Pima Indians have been identified as having the highest rate of type 2 diabetes in the world (almost 50% of the adult population diagnosed) and 20 times the rate of kidney failure as the U.S. population. (California Newsreel, 2008). Often these health issues arise secondarily due to poor eating habits that have developed from life long behavioral and eating patterns.

In the 1890s, the traditional Pima Indian diet was high in fiber and starch and approximately only 15% fat. At that time, most Pima Indians were thin, but currently almost 40% of calories in the Pima diet are derived from fat (Marchand, 2009). In the past

30 years the Pima Indians have led a more sedentary lifestyle and the rate of obesity has increased at an alarming rate in adults and children.

A study performed by the National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Phoenix, Arizona noted an increased BMI of Pima Indian children ages 2-11 and an increased rate of weight gain when compared to reference populations. Approximately 68% of the students in the Gila River Indian Community are in the 85 percentile or above for BMI. Not all overweight children become overweight adults, but there is a greater risk of occurrence.

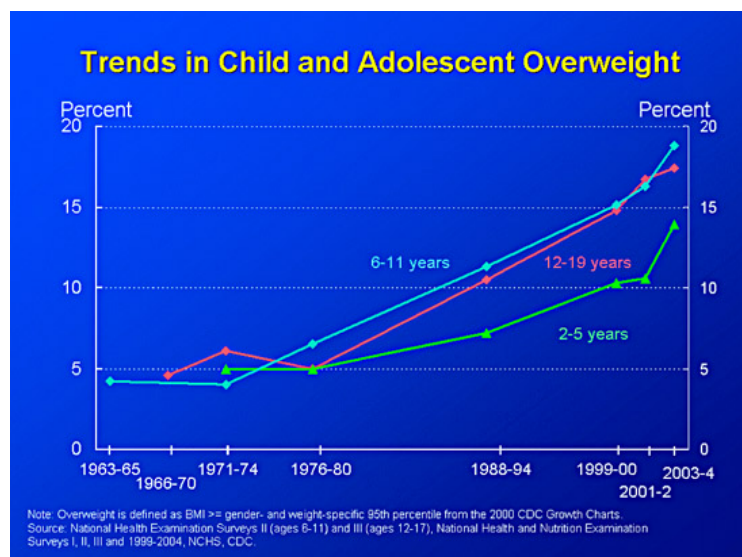
Evidence from a thirty year study of NIH researchers determined that exercising and eating lower fat, fiber-rich foods can delay co-morbid conditions associated with obesity. Revisiting the traditional eating behaviours and active lifestyle of the 1890's Pima Indians can be beneficial in shifting cultural norms and educating the Gila River Indian Community on preventative measures to fight obesity at the early childhood age. Emphasis must be placed on addressing the behavioral, genetic, and social influences of obesity in the children of the community to identify effective preventative measures and solutions.

Obesity in children is a growing concern, with 12.5 million children considered to be overweight in the United States (Office of the Surgeon General, 2010). Many factors contribute to overweight and obesity including genetics, metabolic factors, behavioral habits, environmental, and cultural; as well as social economical influences (CDC NHANES, 2003). All of these factors may play a role in the increasing rate of childhood obesity among the Gila River Indian children.

Obesity is determined by using the body mass index measurement (BMI). The BMI is a measure of weight in relation to height (CDC NHANES, 2003).

$$\text{Formula: } \text{weight (lb)} / [\text{height (in)}]^2 \times 703$$

For adults, overweight is defined as a BMI of 25 or higher and obesity is defined as a BMI of 30 or higher. For children 2-19 years of age, the BMI value is plotted on a chart by their pediatrician to determine the BMI-for-age percentile. Overweight is defined for children as a BMI at or above the 85th percentile and lower than the 95th percentile. Obese is defined for children as a BMI at or above the 95th percentile.



National Health Examination Surveys, CDC

The overall rates of childhood obesity have been increasing in children since 1980. Not all overweight children become overweight adults, but there is greater risk of occurrence. One study found approximately 80% of children who were overweight at age 10-15 years of age, were obese adults at age 25 years. Approximately 68% of the students in the Gila River Indian Community are in the 85 percentile or above for BMI. These statistics cause concern for risks of other health conditions throughout life such as type 2 diabetes, coronary heart disease, hypertension, high cholesterol, and certain types of cancers.

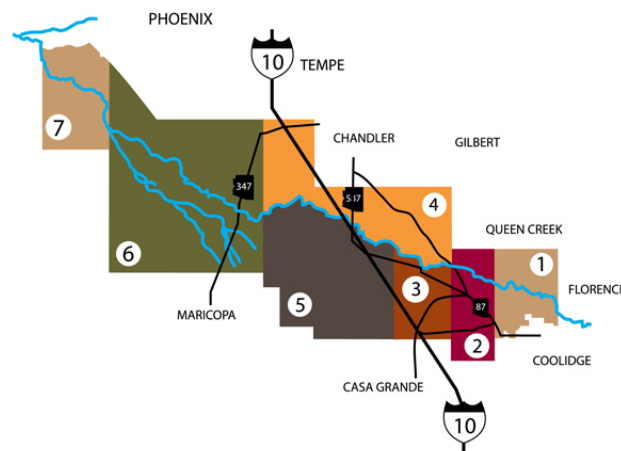
Background on the Gila River Indian Community

The Gila River Indian Community of the Gila River Reservation is located 40 miles south of Phoenix in south-central Arizona and covers a land area of approximately 580 square miles. The Gila River Reservation has a population of 14,000 people with a median age of 22.7 years (ITCA, 2010). This community is a member of the 564 federally recognized tribes that allows for funding and healthcare services. The Gila River Indian Community has taken over operations from IHS to provide self-governance health care to the tribe.

The tribal history states, primarily Pima Indian (Akimel O'odham), were located in these districts. In the 1830's, the Maricopa Indians moved eastward near the Salt River and banded together with the Pima Indians for protection against the Yuman and Apache tribes.

During the 1800s the water supply from the Gila River became increasingly sparse. The community depended on the river to irrigate crops. Upstream barriers and dams were being developed, which over time created a drought in the Gila River community effecting food supply and forcing a slow shift of eating habits from traditional foods to a western diet. In the 1890s, the traditional Pima Indian diet was high in fiber and starch and approximately only 15% fat, but currently almost 40% of calories in the Pima diet are derived from fat (Marchand, 2009).

There are currently 7 districts making up the Gila River Indian Community. The community has a range of employment opportunities but poverty and unemployment continue to remain high. The unemployment rate in 2008 was noted as 21.3% in the Gila River Indian Community as compared to the National average of 5.8%. Operations in the local community include farming, three industrial parks, sand and gravel operations, and casino resorts (Peggy Halpern, Ph. D.).



(The Official Website of the Gila River Indian Community, 2010)

There is limited diversity in race in the Gila River community and there is a large economic disparity when compared to the state of Arizona as a whole. The races in Gila River consist of:

- American Indian (91.0%)
- Hispanic (9.0%)
- White Non-Hispanic (4.2%)
- Other race (2.4%)
- Two or more races (2.1%)

The estimated median house or condo value in 2007 for the Gila River community was \$89,219, but the Arizona median house or condo value in 2007 was \$229,200, representing a 61% deficit in the Gila River community values (City Data, 2007).

Food is available, but with limited food markets on the reservation, most tribal members have to travel 15-20 miles off the reservation to reach a market with fresh fruits and vegetables. Some Gila River Indian residences have no running water or electricity for food storage or meal preparation.

In the Gila River Community, there are 8 community centers, 5 gymnasiums, eight parks, and 2 youth shelters. Some of the recreational facilities available to the community include a walking track and swimming pool but these are limited and resources such as cars, are also limited among tribal members. Mode of transportation is often a necessity in order to be able to travel within some rural parts of the reservation and access these community facilities.

The Gila River Health Center offers dietetic services, school health services and as well as inpatient and outpatient services. Additionally, the center offers an online health research center for health concerns. These services include an online medical dictionary, general health research, ask a nurse, and current public health topics.

Problem

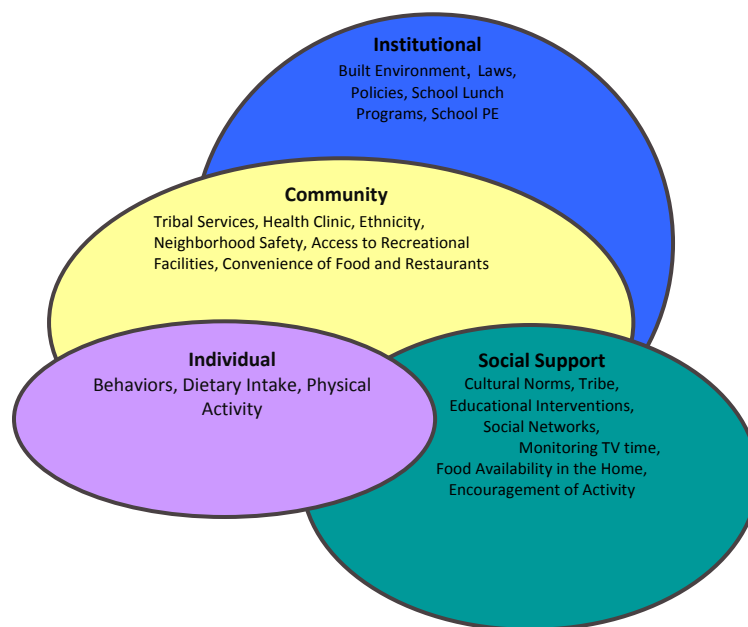
Childhood obesity is a major public health problem, spurring a multitude of health concerns and costs. Overweight and obese children are prone to type 2 diabetes, cardiovascular disease, high blood pressure, high cholesterol, and other medical conditions within their lifetime. These health concerns and costs have an alarming economic impact to the healthcare system. In 1998, a study of overweight and obese patients (BMI 25 and greater), 9.1% of National medical costs were for overweight or obesity related expenses, costing \$78.5 billion. In 2002, the National cost rose to 92.6 billion (Finkelstein, 2003). A study in Medicare beneficiaries revealed that obese beneficiaries were spending an additional \$600 annually on drug costs, as compared to

healthy weight beneficiaries. An additional report from the CDC in 2009 identified 147 billion dollars spent annually on obesity through direct and indirect costs (CNN, 2010).

An economic study of childhood obesity focused on co-morbidities, as well as increased expenditures that were a result of additional outpatient or emergency room visits and prescription drug costs. A multivariable analyses on data from 6-19 year olds in the 2002 to 2005 Medical Expenditure Panel Survey found that children who were obese during both years of the study (2002-2005) had higher outpatient visit expenditures, higher prescription expenditures, higher emergency room expenditures, and higher prescription drug expenditures compared with children who were normal to underweight (Transande, 2009).

These increasing economic burdens of obesity in addition to the Gila River Indian community's predisposition to high rates of obesity, diabetes, kidney failure, and the growing rate of childhood obesity are a foreseen challenge for the self-governance health care system.

Social Ecological Model



Childhood obesity is multi-level public health issue in the Gila River Indian Community. As depicted in the Social Ecological Model there is an intertwining influence on obesity issues that impact the health status and health related behaviors from individual, social, community, and institutional perspectives. So, not only is individual intervention critical for success, but changes to the social, community and institutional systems must also improve concurrently to be beneficial.

Individual



<http://sharlot.org/archives>

Childhood obesity on an individual level begins in the home with eating behaviors. These behaviors can be a life long influence. Attitudes and motivation towards obesity and weight loss is critical in addressing individual factors. Tastes preferences also play a role in eating habits. Researchers have observed preferences of American Indians for fried foods and are often fried in lard or butter rather than vegetable oil. Some of these preferred foods include fry bread, fried potatoes, and fried meats. If the right options are presented and developed at an early stage in life, it is more likely that the positive behavior will be continued throughout lifetime (USDA, 2003).

A study completed on the Pima Indian children indicated that at one-month old, children were on average lighter and shorter than the reference population. Between 1 month and 6

months, weight-for-length largely increased from the reference value. After the age of 2, Pima Indian children were significantly heavier and had higher BMI's than reference values (Lindsay, Cook, Hanson, Salbe, Tataranni, and Knowler, 2002). Researchers from National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) have studied Pima Indians for over 30 years and noted the slower metabolic rates compared to people of the same weight. The high fat diet combined with the slower metabolic rate, may cause high obesity rates in the Pima Indians.

Nutritional health of American Indian and Alaska Native children has changed significantly over the past 30 years. Prior to 1970, malnutrition was a major health issue among these children due to lack of resources and availability of food. The health concern was followed by implementation of food assistance programs. Additionally, increased food availability as well as other improvements in resources has been accompanied by decreases in malnutrition but an increase in childhood obesity (Story, 1998).

Social Support



<http://sharlot.org/archives>



<http://www.cbsnews.com>

Cultural norms play a role in the Gila River community obesity rates. Many of the Pima Indian view large size as being attractive or healthy, not as a serious health problem. To address this health issue on a social level, first the community must be educated on the impact obesity

has on morbidities. Once the tribal community understands the significance of the problem, then social networks can be developed for further discussion and education using community representatives to increase the comfort level of the tribal members.

A CBS report on the Pima Indians quoted Terrol Dew Johnson as saying “When I’m on the reservation, I feel very comfortable because there’s people my size walking around.”, “When I get off the reservation, I feel so fat. I feel so unhealthy, you know?” (CBS News, 2004) Johnson also stated there is a joke when shopping for clothes, instead of large and extra-large, there is the O’odham size, which is similar to 3X or 4X. This demonstrates the accepted social norm of the Gila River Community.

A study on cardiovascular health behavior changes in 5th grade Navajo students at 11 grade schools near Indian reservations in New Mexico. Schools were randomly assigned to intervention groups versus control groups. There were 2018 students observed in this study. The intervention group was taught a 2 hour per week curriculum for 13 weeks that focused on nutrition, exercise, social influences, and tobacco. Native traditions and family members were incorporated into the teaching methods. Studies showed the intervention group decreased the amount of sodium intake, bread intake, and increased exercise compared to the control group (Halpern, 2007).

Many obesity prevention programs target children ages 8 and older, but a new study published by Harvard Medical School on March 1, 2010, in the journal *Pediatrics*, suggest that the ideal age to target children for proper eating and behavioral development in the fight against childhood obesity is in the early life period of infancy to 5 years and perhaps even prenatal stages (Harvard Medical School, 2010).

Community



<http://sharlot.org/archives>

School lunch choices and soda machines in the cafeteria have historically been a source for numerous extra calories. These excess calories can be decreased or eliminated by removing the soda machines and educating the students on healthy lunch options.

A recent proposal has come from the CDC to tax sugar-sweetened beverages as a means to fight the obesity epidemic by increasing the cost of unhealthy drinks, similar to the tax on cigarettes to deter smoking. Several states are considering this proposal. The average American consumes approximately 250 additional calories per day compared to 2 to 3 decades ago, and about 120 calories are from soda or other sweetened beverages. American's have historically recognized the intake of liquid calories less than calories from a solid substance. A mother may be less concerned if her child had a sugary soda before dinner than a candy bar, but the caloric content may be very similar and awareness of the caloric impact is important (CDC, 2009).

Food is available to the Gila River Community through the Federal Distribution Program. The Food Distribution Program on Indian Reservations (FDPIR) provides packages of supplemental food on a monthly basis to low-income house holds living on Indian Reservations and eligible American Indian households near the reservation. Each participating household receives a monthly food package weighing 50 to 75 pounds. The requirements for this program were structured on the asset requirements used in the Food Stamp Program (FSP) and intended to

assist those in remote location who had difficulty traveling long distances to acquire Food Stamps and groceries (USDA, 2003).

Concerns of high fat, sodium, and sugars in the food packages being distributed by the FDPIR prompted a review of the food packages in 1998. As an improvement effort, in 2003 more than 70 different food items were offered in the packages, including canned beef, canned poultry, canned fish, canned fruits, vegetables, and juices.

Food Stamps are available for tribal members who are able to travel to local markets. WIC and food banks are also available as alternative food sources (Halpern, 2007).

Financial cutbacks in school programs frequently limited physical education and sports programs. It is important for the community to understand the importance of these programs and petition to support. The tribal council is not responsible to the state and federal government on educational matters because the Gila River Indian Community is a sovereign nation, but the council provides resources to the school if there is a program deemed especially beneficial. Hospitals and clinics, under the self-governance health care system are also restricted on money and therefore limit prevention programs.

Institutional



<http://www.ushistoricalarchive.com>



<http://ddbc.arizona.edu>

The built environment of the Gila River Indian community causes barriers to healthy eating and behaviors. Some homes in the community have no running water or electricity to prepare or store food. The irrigation system is still under proposal to assist with growing fresh fruits, vegetables, and traditional foods. Childcare facilities are limited within the community. Childcare facilities and preschools could allow the forum for teaching proper eating habits to children at a young age as well as allow for the supervision of children, while adults exercise. Swimming pools and walking paths are also at a minimum.

Systems Map

A systems map is an additional method to assess health issues in a community. This map visually depicts the intertwining causal and preventative factors of health issues from an individual, social, community, and institutional level. A systems map can be used to initially assess the childhood obesity health problem in the Gila River Indian community and to identify preventative measures to improve the health issue.

The systems map developed for the Gila River Indian Community, assessing the concerns of childhood obesity, demonstrates the influence on health behavior from parents, community members, and the built environment as causal factors as well as addressing these pathways as preventive measures.

**See Attachment A: Systems Map; Gila River Indian Community Health Assessment:
Childhood Obesity**

Prevention

Research on obesity and diabetes is difficult to understand and a very lengthy process. There are multiple causes due to behavioral, genetic, and social influences. After thirty years of research by NIH scientist Dr. Bill Knowler and others, evidence shows that exercising and eating lower fat, fiber-rich foods can at least delay diabetes, a co-morbid condition associated with obesity.

Family Focused Interventions

Encourage exercise and activity and reduce sedentary time. The Gila River Community watches an average of 3 hours of TV per day. Video games and the internet have been an increasing encouragement for children to be sedentary. Safety is one reason noted by the community for children staying indoors and being sedentary. The combination of computer, television, and video games is recommended to be limited to 2 hours per day. The American Pediatric Association does not recommend television viewing for children 2 years or younger, but encourage family to be active with their children (CDC, 2010 Tips for Parents).

Families in the Gila River Indian Community can encourage aerobic activity starting in childhood. Recommendations of at least 60 minutes or more of bike riding, jogging, brisk walking, or sports in a child's days, 3 times per week can help improve childhood overall health and decrease their risk for obesity. Muscle strengthening activities such as jumping rope, rock climbing, and other age appropriate sports can be beneficial in weight control.

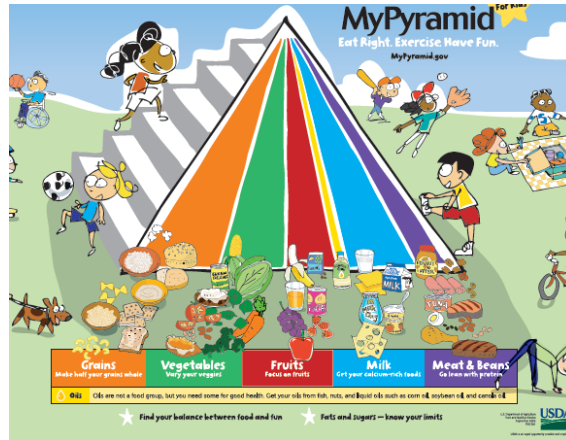
The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) physical fitness recommendations state to aim for at least 30 minutes of physical activity most days of the week and to keep an exercise log for accountability. There are many ways to be

active during daily routines, making exercise fun for children, playing team sports, planning activities with family and friends, increases desire and success rates of exercise.

Community Focused Interventions

Encouraging healthy eating habits in Gila River Indian community children with the use of family members and Community Resource members can also assist in prevention of obesity. Through collaboration with community partners, education programs can be developed in the pre-schools and grade schools by community resource members to develop healthy behavioral habits at an early age. Historically, the Gila River Community has been more receptive to previous programs using Community Resource educators. Use of these educators can provide education on healthy eating habits, while still eating traditional tribal foods.

These education programs should include promotion of 2-3 servings of fruits and vegetables per day and a daily serving of whole grain products. Many American Indian and Native American's are deficient in calcium, so it is important to emphasize the importance of low-fat milk and dairy products. Educate the children and their families on the importance of lean meats, poultry, and fish as well as proper portion sizes, typically presented as the size of the consumer's fist. Encourage low sugar drink choices and plenty of water. Educate on the importance of decreased sugar and fat consumption to prevent obesity using learning tools such as MyPyramid from the USDA.



http://www.mypyramid.gov/tips_resources/printmaterials.html

Recreation facilities are minimal on the Reservation. Education of community members and the tribal council of the critical need for these community services are important for progress. Community leaders should identify stakeholders to form a committee to develop a proposal for additional playgrounds, walking paths, and swimming pools, within the 7 Districts. Additionally, within the proposal, it is important to consider daycare and basic swimming skills, as a barrier to exercise and should be considered in the planning process.

A 2004, CBS 60 Minutes report noted at St. Peter Indian Mission School in the Gila River Community, 200 of the students were overweight and at risk for more severe health issues associated with overweight and obese individuals. The school has since started a running program, which is the first priority in the morning as soon as the children get off the bus. They put their backpacks against the fence and run (Leung, R., 2004).

Medication Focused Interventions

There are minimal medications that can be utilized in pediatrics for treatment of obesity due to limited studies. Behavioral modification is the preferred method of prevention.

One medication that has been used for obesity in children over 12 years of age, is orlistat (Xenical™, Alli™). This medication is a lipase inhibitor for obesity management that acts by inhibiting the absorption of dietary fats in the stomach and small intestines. At the recommended therapeutic dose of 120 mg three times a day, orlistat inhibits dietary fat absorption by approximately 30%. The cost of the medication is approximately \$6 per capsule.

Type 2 diabetes (formerly referred to as adult-onset diabetes) is the most common type of diabetes in American Indians. When diabetes occurs during childhood, it is often assumed to be type 1, or juvenile-onset diabetes, but in the last two decades, type 2 diabetes has increased in frequency among U.S. children and adolescents. People develop type 2 diabetes because the cells in the muscles, liver, and fat do not use insulin properly. Eventually, the body cannot make enough insulin. As a result, the amount of glucose in the blood increases while the cells are starved of energy. Over time, high blood glucose damages nerves and blood vessels, leading to problems such as heart disease, stroke, blindness, kidney failure, and amputation.

Metformin is a common oral antihyperglycemic that improves glucose tolerance when used in the management of type 2 diabetes mellitus in adults and children (10-16 years of age). The dosage is individualized on the basis of both effectiveness and tolerance, while not exceeding the maximum recommended daily dose of 2550 mg in adults and 2000 mg in pediatric patients (10-16 years of age). The maximum recommended daily dose of the extended release formulation of metformin in adults is 2000 mg. The cost of the medication is approximately \$0.75 per day.

The Diabetes Prevention Program (DPP) was a 27 center randomized clinical trial funded by NIH, with the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) leading the study that occurred between 1996 and 2001. There were 3,235 participants, approximately half were from ethnic or minority groups and 5% (N=171) were

American Indian from reservations in the Southwest. Within this study were participants from the Gila River Indian Community.

The DPP study randomly assigned participants to one of three interventions:

- Lifestyle recommendation plus metformin
- Lifestyle recommendations plus placebo
- Intensive lifestyle modifications

The DPP study found there were no differences in treatment effects by racial or ethnic group, but the lifestyle modification reduced the incidence of diabetes by 58% and the metformin by 31%.

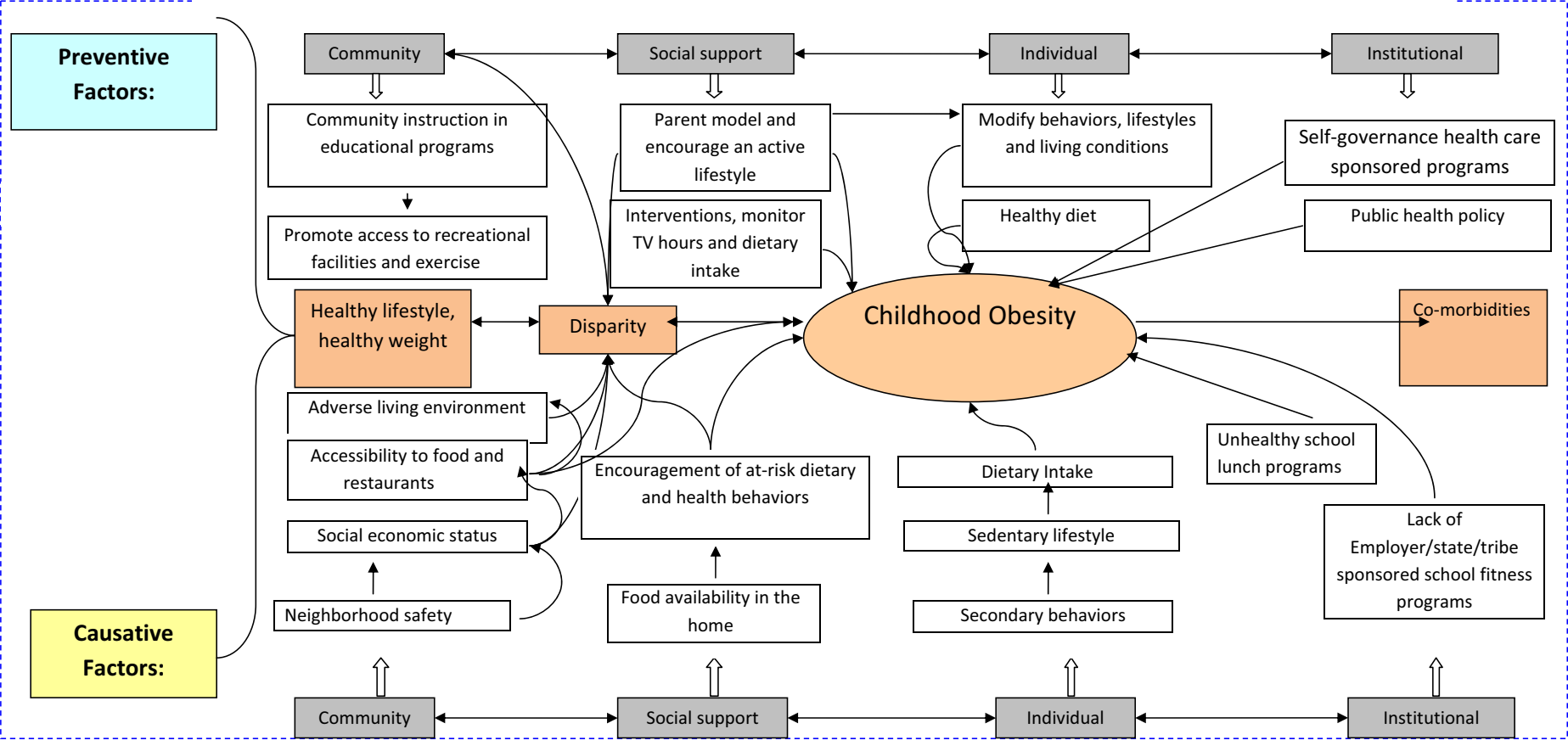
The intensive lifestyle modification used for this study included, goal based behavior, a case manager (same ethnic group), frequent contact throughout intervention, and intervention material to address an ethnically diverse population. This study demonstrates that structured lifestyle changes can be more impactful than medication (Halpern P, Ph. D. 2007).

Conclusion

There is a high prevalence of overweight and obese children in the American Indian population and in the Gila River Community. Approximately 68% of the students in the Gila River Indian Community are in the 85th percentile or above for BMI. This is concerning due to the long term risks of co-morbidity health issues associated with obesity including diabetes, coronary heart disease and hypertension. There are many interlinking behavioral, social, economic, and cultural issues that impact the obesity problem. Three decades of research by NIH scientist provide evidence demonstrating that exercising and eating lower fat, fiber-rich foods can decrease weight and delay co-morbid conditions associated with obesity. Additional studies through NIDDK have highlighted the significant benefits of structured lifestyle changes.

To implement the changes, it is important to develop community programs, improve the built environment, and increase social support through the collaboration of family, community, and tribal leaders.

Gila River Pima Indian Community Health Assessment: Childhood Obesity



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